



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/617,749	07/17/2000	Jerry McKinney	Clearstrm-6	8682

7590 11/30/2001

C James Bushman  
Browning Bushman  
5718 Westheimer Suite 1800  
Houston, TX 77057

EXAMINER

BARRY, CHESTER T

ART UNIT

PAPER NUMBER

1724

DATE MAILED: 11/30/2001

12

Please find below and/or attached an Office communication concerning this application or proceeding.

MF

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/617,749	MCKINNEY, JERRY	
	Examiner	Art Unit	
	Chester T. Barry	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on 6/4/01, 6/08/01, 6/19/01.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-10 and 17-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-10 and 17-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)                      18) ☒ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      20) ☐ Other:

Art Unit: 1724

Comments on the Manner of Making Amendments.....	2
Objections to the Manner of Making Amendments.....	3
a) 37 CFR 1.173(b)(2): Claims 7 and 10.....	3
b) 37 CFR 1.173(b)(2): Claims 17 – 19.....	5
c) Claim 3 is objected to for minor informalities.....	6
d) The insertion to col. 5 line 12.....	7
35 USC §112(2).....	7
35 U.S.C. §102(e) - Anticipation.....	8
35 U.S.C. §103(a) Obviousness over McKinney '470 and Adams '459.....	9
Allowable Subject Matter.....	16
35 U.S.C. §112(1) – Enablement.....	16
Rejections Based on Clearstream Brochure.....	21
Response to Arguments.....	21
Observation regarding Certificate of Mailing Date.....	23
Objection / Rejection to Reissue Oath.....	23
Appendix A.....	24

## Comments on the Manner of Making Amendments

This comment is not an objection. The Office would prefer, but does not require, that consecutive deleted words be enclosed within a single pair of brackets. For example, rather than

“ . . . [to water and CO<sub>2</sub>][, said aeration chamber having a bottom and side walls], . . . ”

as set forth by applicant (June 4, 2001, amendment at page 5, claim 1 lines 6-7 and claim 7 lines 4 - 5), the Office would prefer the format of the amendment be

“[to water and CO<sub>2</sub>, said aeration chamber having a bottom and side walls],”  
insofar as comprehension of the nature of the deletion is facilitated.

Furthermore, the Office would prefer that consecutive insertions be grouped together by a single underlining, rather than multiple underlinings. For example, also in claim 1, rather than

“ . . . the improvement [comprising a diffuser] wherein said aeration system [for releasing the oxygenation gas as bubbles into the aeration chamber of the

Art Unit: 1724

wastewater treatment plant, said diffuser] forms an aeration area adjacent the intersection of the bottom and side walls of the vessel and provides [providing] sufficient flow . . . . "

the Office would prefer that the format be

" . . . the improvement [comprising a diffuser for releasing the oxygenation gas as bubbles into the aeration chamber of the wastewater treatment plant, said diffuser providing] wherein said aeration system forms an aeration area adjacent the intersection of the bottom and side walls of the vessel and provides sufficient flow . . . . "

insofar as comprehension of the claim amendment is more efficiently communicated to the examiner.

## **Objections to the Manner of Making Amendments**

a) 37 CFR 1.173(b)(2): Claims 7 and 10

Claims 7 and 10 are objected to under 37 CFR 1.173(b)(2)<sup>1</sup> for failure of some text enclosed in brackets (i.e., "[ . . . ]") to accurately indicate the text "relative to the patent"<sup>2</sup> which is being omitted by the amendment. The rule requires that "the matter to be omitted by reissue"<sup>3</sup> be enclosed in brackets. Specifically, claim 7 (twice amended) (amendment filed June 4, 2001) is objected to for want of the original patent claim 7 to include the phrase, ". . . comprising to generate a current . . . ." (sic, underlining in original of amendment filed June 4, 2001). Similarly, claim 7 (twice amended) (amendment filed June 4, 2001) is objected to for want of the original patent claim 7 to include the phrase, ". . . from at a position . . . ." (sic, underlining in original of

---

<sup>1</sup> Effective November 7, 2000, per 65 FR 54604, Sept. 8, 2000.

<sup>2</sup> 37 CFR 1.173(d).

<sup>3</sup> 37 CFR 1.173(d)(1).

Art Unit: 1724

amendment filed June 4, 2001). Similarly, claim 7 (twice amended) (amendment filed June 4, 2001) is objected to for want of the original patent claim 7 to include the phrase, "... side wall of the aeration chamber, in a direction ..." (sic, underlining in original of amendment filed June 4, 2001).

If no substantive amendments are made to claim 7,<sup>4</sup> **this** basis for objection may be overcome by resubmitting claim 7 as:

7. (twice amended) In an aerobic ...  
... the improvement comprising means for injecting ...  
... from [a position] an aeration area close to the bottom and the  
side wall of the [aeration chamber] vessel, the current pattern ...

Similarly, claim 10 (twice amended) (amendment filed June 4, 2001) is objected to for want of the original patent claim 10 to include the phrases, "... the aeration chamber in an area adjacent the intersection of said side wall and said bottom wall, the current ..." and "... said area in a direction perpendicular ..." (sic, underlinings in original of amendment filed June 4, 2001). Furthermore, although the phrase, "a position close to the bottom and the side wall of the aeration chamber" did appear in patent claim 10, it did not appear underlined in patent claim 10, as applicant's enclosure in brackets of the underlined text, "a position close to the bottom and the side wall of the aeration chamber" would suggest. If no substantive amendments are made to claim 10,<sup>5</sup> **these** bases for objection may be overcome by resubmitting claim 10 as:

10. (twice amended) An aerobic ...

---

<sup>4</sup> If any substantive amendments to claim 7 are made, the claim should be drafted as "7. (thrice amended) ..."

<sup>5</sup> If any substantive amendments to claim 10 are made, the claim should be drafted as "10. (thrice amended) ..."

Art Unit: 1724

... means for injecting ... the aeration chamber, the current pattern having at least one first component flowing upwardly from [a position close to the bottom and the side wall of the aeration chamber] in a direction perpendicular ...

But see also the "informality" objection to claim 10 (twice amended) noted below.

Claim 7 is also objected to for the following informality (unrelated to 37 CFR

1.173): "... to the clarifier chamber and, and sixth and seventh ..." It appears that "... to the clarifier chamber and, sixth and seventh ..." was intended.

Claim 10 is also objected to for the following informality (unrelated to 37 CFR

1.173):

"... flowing upwardly from in a direction ..." cannot be understood. It appears that "flowing upwardly in a direction" was intended. If deletion of the word "from" which appeared in patent claim 10 was intended, then all of the foregoing objections to claim 10 can be overcome by re-presenting claim 10 (twice amended) (caveat: see footnote 5) as:

10. (twice amended) An aerobic ...

... means for injecting ... the aeration chamber, the current pattern having at least one first component flowing upwardly [from a position close to the bottom and the side wall of the aeration chamber] in a direction perpendicular ...

b) 37 CFR 1.173(b)(2): Claims 17 – 19

Claims 17 – 19 are objected to under 37 CFR 1.173(b)(2) for failure of some text enclosed in brackets to have appeared in the original patent and to properly parenthetically indicate the status of these claims as "new" claims.

Claims 17 – 19, each of which recites “said [diffuser]” or “[a diffuser]” (sic, brackets in original), are objected to for want of claims 1 and 7 (sic, not “1, 7, and 18”) to either provide antecedent basis for “said [diffuser]” or for “[a diffuser] an injection system” to make any sense. No rejection is predicated on §112, second ¶, grounds, however, because it appears that the genesis of the objection lies only in failure to comply with 37 CFR 1.173(g).<sup>6</sup> That rule requires that all amendments be made vis-à-vis the patent rather than any prior amendment.<sup>7</sup>

Furthermore, insofar as the parenthetical expressions “new” and “amended” also reflect claim status vis-à-vis the original patent, all pending newly added claims must throughout reissue prosecution bear the parenthetical “(New).”<sup>8</sup> These bases objection may be overcome by re-presenting claims 17 – 19 as follows:

17. (New) The wastewater treatment plant of claim 1 wherein said aeration system comprises multiple diffusers.

18. (New) The wastewater treatment plant of claim 7 wherein said means to generate said current comprises an injection system for creating an injection area adjacent the intersection of said side wall and said bottom wall.

19. (New) The wastewater treatment plant of claim 18 wherein said injection system comprises multiple diffusers.

c) Claim 3 is objected to for minor informalities

While claim 3 is reasonably precise with respect to the “released oxygenation gas,” i.e., that the “released” oxygenation gas is the same material as the “oxygenation

---

<sup>6</sup> Effective November 7, 2000, per 65 FR 54604, Sept. 8, 2000.

<sup>7</sup> “[D]iffuser” language appeared in prior versions of “new” claims 17-19 (i.e., claims added during reissue).

<sup>8</sup> The examiner apologizes for any informal instructions to the contrary on this parenthetical point.

Art Unit: 1724

gas" of claim 1, it is preferred that applicant remove the possibility of misconstruction by deleting "released" from claim 3.

d) The insertion to col. 5 line 12

The insertion to col. 5 line 12 of the specification is objected to under 37 CFR 1.173(b)(1) and 1.173(d)(1) for want of that portion of the specification appearing in the patent to include any of the bracketed text denoted at page 4 of the June 4, 2001, amendment. In the alternative, the specification is objected to under 37 CFR 1.173(d)(1) insofar as it does not appear that applicant intended that in the reissue specification bracketed expressions appear as inserted text. All underlined text must be new vis-à-vis the original patent claims or specification, not vis-à-vis any prior amendment. 37 CFR 1.173(g). Removal from the paragraph beginning at col. 5 line 12 of all text that is *both* bracketed and underlined is required. See Appendix A noting the column 5 instances of impermissible simultaneous<sup>9</sup> underlining and bracketing.

### **35 USC §112(2)**

Claim 3 is rejected under 35 USC §112, second paragraph, for failing to particularly pointing out and distinctly claimed the subject matter. It is unclear how the scope of claim 1 differs from that of claim 3.

Claims 18 and 19 are rejected under 35 USC §112, second paragraph, for failing to particularly pointing out and distinctly claimed the subject matter. It is unclear if the



Art Unit: 1724

"means to generate said current" of claim 18 is the same as the "means for injecting an oxygenation gas and generating a wastewater current pattern" of claim 7, on which claim 18 depends. Claim 19 is rejected for the reasons given with respect to claim 18.

### **35 U.S.C. §102(e) - Anticipation**

Claims 1, 3 are rejected under 35 USC §102(e) as being anticipated by USP 5766459 to Adams.

Adams describes an aerobic wastewater treatment plant comprising a vessel defining an aeration chamber containing aerobic bacteria into which wastewater containing organic solids flows to be exposed to aerobic bacteria to aerobically digest the organic solids in the wastewater. The aeration chamber has a substantially flat bottom wall and a cylindrical side wall. Adams also describes an aeration system in the aeration chamber to support growth of the aerobic bacteria. Adams also describes a clarifier chamber formed in the vessel and into which wastewater from the aeration chamber flows upwardly toward an outlet pipe 208 through which the wastewater flows from the wastewater treatment plant. The clarifier chamber is defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber. The aeration system forms aeration areas substantially throughout the aeration chamber, including at least one aeration area adjacent the intersection of the bottom and side walls of the vessel.<sup>10</sup>

---

<sup>9</sup> Simultaneous underlining and bracketing are permissible only if the text to be deleted was underlined in the original patent or if the text to be added includes the bracket ("[" or "]"") character.

<sup>10</sup> The claims require only an aeration area. The claims do not preclude more than one aeration area or aeration areas substantially throughout the aeration chamber.

Art Unit: 1724

The aeration system provides sufficient recirculation liquid flow (by dint of sufficient aeration gas flow and the "differential imbalance arrangement of the diffused air aeration system," col 3 line 39) such that all solids suspended within the plant are forced into circulation. A current pattern having at least one first component flowing upwardly in a direction perpendicular to the bottom wall of the vessel and parallel to the side wall of the vessel, second and third components that flow in opposite directions around the partition which defines the clarifier chamber, a fourth component that flows along the opposite side wall to the bottom, and sixth and seventh components that flow in opposite directions adjacent the bottom wall of the vessel is induced by the imbalanced aeration gas flow. The aeration system provides sufficient oxygenation gas to allow the aerobic bacteria to digest the organic solids in the wastewater. Adams clearly shows a sweep flow underneath the clarifier bottom opening upon which flow applicant's "fifth component" reads.

**35 U.S.C. §103(a) Obviousness over McKinney '470 and Adams '459**

Claims 1, 3, 4, 5, 7, 8, 9, 10, 17-19, 20-24, 25-27, 29-31 are rejected under 35

USC §103(a) as being unpatentable for obviousness over applicant's earlier patent USP 5221470 ("McKinney '470") alone or further in view of Adams '459.

McKinney '470 describes an aerobic wastewater treatment plant comprising

Art Unit: 1724

a vessel (10)<sup>11</sup> defining an aeration chamber (20) containing aerobic bacteria into which wastewater containing organic solids flows to be exposed to aerobic bacteria to aerobically digest the organic solids in the wastewater. The aeration chamber has a substantially flat bottom wall (A)<sup>12</sup> and a cylindrical side wall (10). McKinney '470 also describes an aeration system in the aeration chamber to support growth of the aerobic bacteria. McKinney '470 also describes a clarifier chamber formed in the vessel and into which wastewater from the aeration chamber flows upwardly toward an outlet pipe (30) through which the wastewater flows from the wastewater treatment plant. The clarifier chamber is defined by a partition in the form of an inverted, truncated cone (18) into the bottom of which (clarifier opening 26) the wastewater flows from the aeration chamber. The aeration system forms an aeration area adjacent the intersection of the bottom and side walls of the vessel. During periods in which one of the two diffuser is taken off line by closure of valve 42 or 44,<sup>13</sup> the aeration system provides sufficient recirculation liquid flow (by dint of sufficient aeration gas flow) such that all solids suspended within the plant are forced into circulation. Inherently, during shut-off of one of the two diffusers, a current pattern having at least one first component flowing upwardly in a direction perpendicular to the bottom wall of the vessel and parallel to the side wall of the vessel, second and third components that flow in opposite directions around the partition which defines the clarifier chamber, a fourth component that flows

---

<sup>11</sup> Numeric reference numerals refer to the reference numerals as shown in the McKinney '470 patent. Alpha reference notations refer to the examiner annotations to the drawings in McKinney '470.

<sup>12</sup> While McKinney '470 does not describe a substantially flat bottom wetted surface by virtue of the conic-shaped wetted surface of the deflector, a substantially flat bottom wall of the vessel is clearly shown. It is on this substantially flat bottom wall that the deflector is attached. See Fig. 3. *infra* ("A").

<sup>13</sup> See the discussion of this point from the previous Office action.

Art Unit: 1724

along the opposite side wall to the bottom, and sixth and seventh components that flow in opposite directions adjacent the bottom wall of the vessel is induced by the aeration gas flow. The aeration system provides sufficient oxygenation gas to allow the aerobic bacteria to digest the organic solids in the wastewater. It is unclear if the current pattern induced by the aeration gas flowing through only one of the two diffusers has a fifth component that flows across the bottom under the opening to the clarifier chamber. That is, it is unclear if a current component rises up over a portion of the deflector 27 underlying clarifier opening 26 and back down the opposite side of the deflector towards the solitary operational diffusers without being swept up into the clarifier proper given the hydraulic driving force present at times when wastewater is actually flowing<sup>14</sup> into the treatment plant through inlet 24. Furthermore, it is unclear during periods of no wastewater influx whether currents flowing across the bottom wall would rise up over at least a portion of the deflector underlying the clarifier opening, as shown by arrow "A" in Fig. 1 *infra*, or if the "cross-flow" would simply separate laterally into two branches "B" at the intersection of the deflector and the bottom wall, as shown by arrows "B" in Fig. 2 *infra* (without any split flow lying underneath clarifier opening 26).

In the background section of this reissue application, Applicant described "a second basic design" of treatment plant known in the art. Applicant said,

The second basic design of treatment plants includes a partition that is shaped like an inverted, truncated cone. This partition divides the tank into the two chambers, an outer aeration chamber and an inner clarifier chamber. This design *may* also incorporate a pyramid shaped deflector

---

<sup>14</sup> The skilled artisan would have realized that wastewater feed rate depends on the rate of waste water generation at the source. Such rate is neither constant nor continuous. For example, during periods of vacancy, the wastewater flow rate from the source, e.g., residence, would have been expected to be zero.

Art Unit: 1724

placed beneath the truncated conical partition to deflect solids settling out of the clarifier chamber back into the aeration chamber for further bacterial digestion.

(emphasis added). Applicant, therefore, admitted that provision of a pyramid shaped deflector plant in this type of prior art treatment plant, such as that exemplified by the McKinney '470 patent, was merely optional. It would have been obvious, therefore, for the skilled artisan to have omitted from the McKinney '470 treatment plant the deflector in view of the recognition in this art, as shown by applicant's admission, that such deflectors were merely optional.

Alternatively, it would have been obvious to have omitted the deflector from the McKinney '470 design because USP 5766459 to Adams teaches the desirability of inducing a "horizontal sweep . . . across the bottom 36" (Adams, col 3 line 33) to prevent sludge buildup. The claimed invention reads on this suggested embodiment when one diffuser is taken out of service for repair.

Alternatively, and with particular relevance to claim 17, it would have been obvious to have intentionally imparted a differential imbalance to the two McKinney diffusers and to have removed the deflector because Adams teaches the desirability of inducing a "horizontal sweep . . . across the bottom 36" (Adams, col 3 line 33) to prevent sludge buildup beneath the clarifier opening. As admitted by applicant in this application, it was known that solids tend to accumulate near the base of deflectors (col. 2 line 29). Accordingly, in addition to Adams suggestion to not use deflectors, the skilled artisan would have been further motivated to remove the deflector from the

Art Unit: 1724

McKinney '470 system in view of the recognition in the art that solids tended to accumulate at the base of the deflectors.

[this space intentionally left blank]

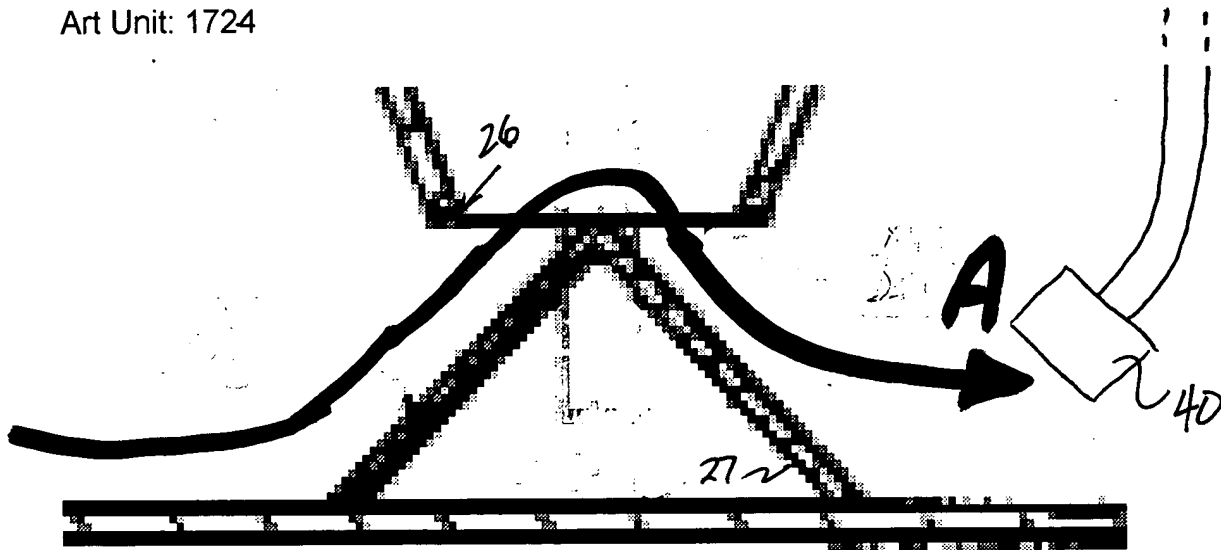


Fig. 1 (SIDE VIEW)

Fig. 2 (TOP VIEW)

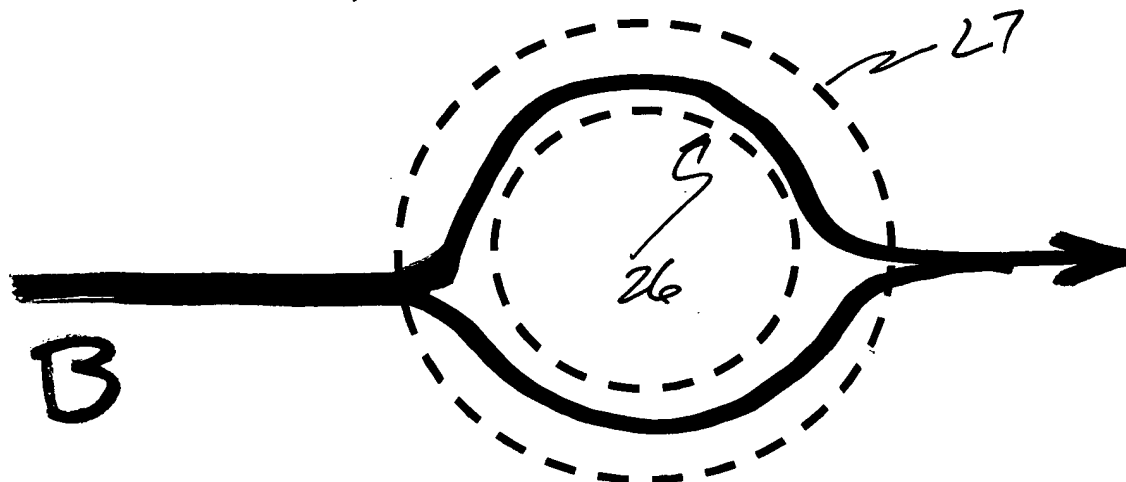
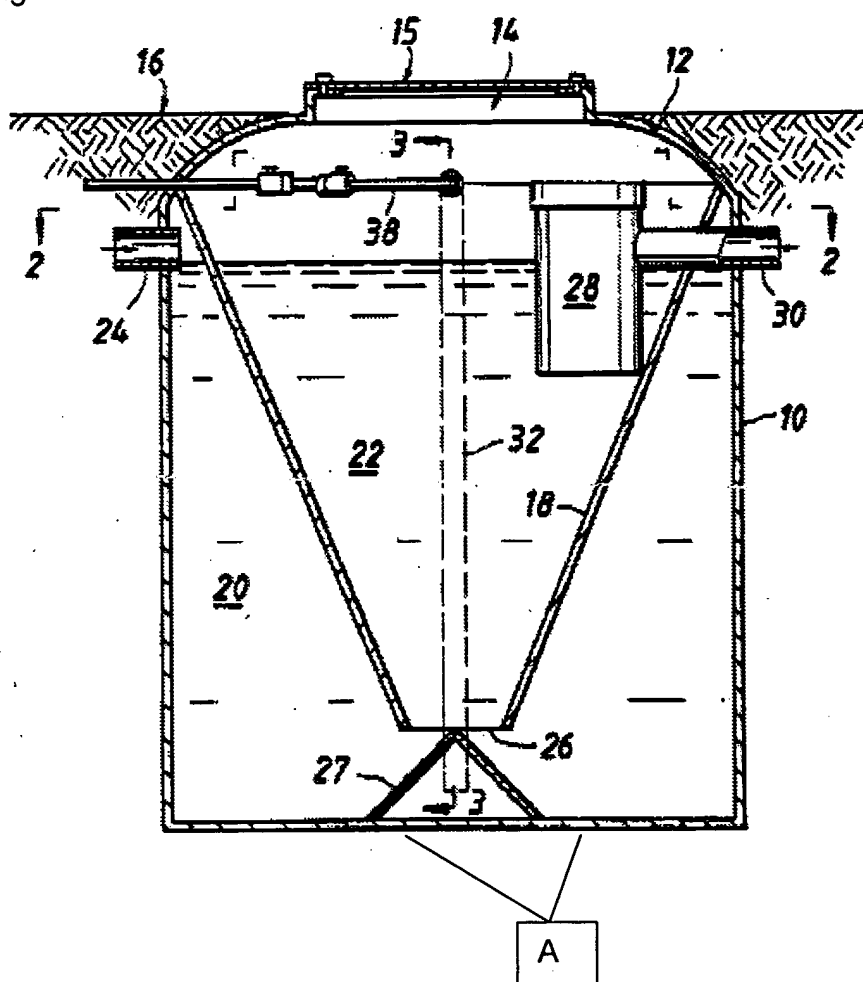


Fig. 3





### **Allowable Subject Matter**

Claims 6, 28 are objected to as being dependent on a rejected base claim, but would be allowed if presented in independent form.

While some prior art, such as USP 4259182 to Belveal, teaches that an air diffuser can or should be placed immediately adjacent to the lower portion of the inverted truncated clarifier cone structure, as best shown in Belveal Fig. 10, for example, McKinney '470 teaches away from running the conduit generally parallel to the partition insofar as McKinney '470 is directed to solving problems germane to aerated tanks having diffusers "adjacent the outside walls" of the tank (col 2 line 3). Combination of Belveal (or other patents showing placement of diffusers adjacent to the bottom portion of inclined solids-settling inducing structures) with McKinney '470 to show the obviousness of claim 6 would tend to "destroy" the McKinney '470 teachings with respect to placement of the diffusers.

### **35 U.S.C. §112(1) – Enablement**

Claims 17, 19, 21, 22, 24 are rejected under 35 U.S.C. 112, first paragraph,<sup>15</sup> for failure to describe the claimed subject matter in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use

---

<sup>15</sup> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1724

the invention characterized by the desired current pattern generated by multiple diffusers.

An undue amount of experimentation is required in order to produce the current pattern recited in the claims using multiple diffusers. Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized by the Board in Ex parte Forman, 230 USPQ 546 (BOPAI 1986).<sup>16</sup> The factors include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. In re Wands, 8 USPQ2d 1400 (Fed. Cir. 1988).

Applying Forman to the facts of the claimed invention in this application:

(1) the quantity of experimentation necessary: The application failed to describe the air pressure and wastewater flow rate and/or air flow rate at which both good mixing, i.e., "solids suspension," and the "solids pulling" advantage were achieved. The art of record<sup>17</sup> teaches also that the flow rate necessary to achieve good air bubble / diffuser mixing is a function of the MLSS (mixed liquid suspension solid, mg/L) of the wastewater being treated. None of the air pressure, wastewater flow, air flow rate, and MLSS of the wastewater was disclosed by applicant. While conducting experiments to vary and optimize these four process variables to achieve the degree of mixing and

---

<sup>16</sup> BNA has incorrectly named this case Ex parte Formal (sic, Forman).

<sup>17</sup> Grady, p. 700, Eqn. 17-23.

Art Unit: 1724

current pattern claimed could be accomplished, it would require a significant amount of effort which would amount to undue experimentation.

(2) the amount of direction or guidance presented: Apart from virtually no direction or guidance as to the appropriate values of the air pressure, air flow rate, maximum wastewater influx rate, and MLSS at which satisfactory operation, i.e., solids suspension via the desired current pattern and "solids pulling," could reasonably be expected, the application failed to specify how close multiple diffusers must be positioned one to the other to avoid "interference dead zones," such as those noted by applicant's assessment of the Drewery patent ("Drewery '239").

(3) the presence or absence of working examples: No working examples using multiple diffusers were presented. Moreover, while one example using one diffuser is listed in the application (col 5 line 62+), it fails to specify the air diffuser pressure or wastewater influx feed rate. Instead, only the unspecified quantities "[x] psig" and "[y] flow rate" (brackets, including variables x and y, in original) are disclosed(!).

Accordingly, while a **working** example using one diffuser was provided, insufficient disclosure of the working example test conditions was communicated to the skilled artisan (for want of sufficient experimental test condition details, e.g., air pressure and wastewater feed rate).<sup>18</sup>

---

<sup>18</sup> Applicant stated:

Experimentation was conducted on a base case of a 850 gallon tank using one air diffuser at [x] psig and [y] flow rate. The current pattern described above was observed. The current sweeps up the side wall above the diffuser in direction 100, around the partition in directions 102 and 104, down the opposite side wall in direction 106, and across the bottom in directions 108, 110, and 112. It can be observed that the flow turns below the truncated conical partition creating slight suction which pulls solids out of the bottom

Art Unit: 1724

(4) the nature of the invention: On its face, fluid mechanics of relatively dilute wastewater through a static tank without moving parts might strike one as a relatively simple problem. But the problem is a far more complicated one. The feed is a multiphase fluid comprising a liquid of varying composition including suspended solids of varying size and consistency. The fluid mechanics of the system is a time dependent, rather than a steady state, problem because the wastewater feed rate varies unpredictably over time. The vessel geometry (cylinder with an inverted frustoconical partition therein) does not allow for "simple case" analytical techniques. The vessel geometry and time dependencies suggest instead that numerical, computation-intensive analytical techniques employing solution of complex boundary conditions be employed to predict flow patterns.

(5) the state of the prior art: Applicant himself acknowledged that the use of diffusers in multiple locations "necessarily" creates the problem of circulatory dead spots where sludge accumulates. In applicant's discussion of Drewery '239 (col 3 lines 1-2), applicant states that a dead zone is created on the bottom of Drewery '269's substantially flat bottomed / inverted cone clarifier vessel "with the use of multiple diffusers." Furthermore, applicant admits that this problem is accentuated because air entering the multiple diffusers is "not emitted evenly" or "balanced" (col 2 line 24 - 38). Applicant does not appear to discuss how the air balancing problem is solved. Even so,

---

of the clarifier chamber by this action. Thus, the defined current not only mixes the solids and water for maximum digestion of the waste such that fewer particles are available to enter the clarifier chamber, but the current also serves to pull solids out of the bottom of the clarifier chamber for further digestion in the aeration chamber.

Art Unit: 1724

there is some evidence (Belveal) to suggest that the problem of sludge settling in dead zones of multiple diffusers is actually worse in air flow-balanced diffusers than those having an intentionally imposed air flow imbalance.

(6) the relative skill of those in the art: The prior art in the septic tank / clarifier field, as shown by the art of record, does not appear to be based on highly developed theoretical principles or fluid mechanic mathematical models. This observation, while somewhat subjective, tends to indicate a relatively lower level of skill in the art compared to other more technically developed arts, such as high temperature and pressure chemical reaction engineering and chemical reactor design, for example.

(7) the predictability or unpredictability of the art: As indicated by the complexities of the fluid mechanics of the inverted cone clarifier / treatment vessel noted in section (4) and relatively lower level of skill in the art noted at section (6) above, the art tends to be more unpredictable than other arts for which predictive empirical or theoretical mathematical models have been developed. Further, biological reactions systems, such as the type involved in aerobic digestion of suspended solids, tend to be relatively complex reaction systems compared to strictly non-biological chemical reaction systems.

(8) the breadth of the claims: While a horizontal spacing distance of 3 – 4 in. between multiple diffusers was taught as being a preferred spacing, the claims are not limited to this preferred horizontal spacing. Additionally, the claims reciting multiple diffusers are not limited to those placed “generally below” the wastewater inlet even

Art Unit: 1724

though the application states that such placement "allows for," i.e., accounts for, a desired oxygenation rate and the current pattern recited in the claims.

In short, given the factors listed above, undue experimentation would be necessary for the person having ordinary skill in the art to make and use the claimed invention.

### **Rejections Based on Clearstream Brochure**

The Declaration filed by Mr. McKinney overcomes the rejections based on the Clearstream brochure.

### **Response to Arguments**

Applicant argues McKinney '470 is an "accidental anticipation." The examiner is unaware of any exception to anticipation based upon accidental or mistaken publication of a description of the claimed invention more than one year before the application's effective filing date. The §102(b) rejection over McKinney '470 has been withdrawn, however, due to limitations added to the claims previously rejected on this basis. The rejection was not dropped based on any "accidental anticipation" theory. Accordingly, the examiner's view is that the McKinney '470 disclosure remains available as prior art for use in the §103(a) rejection noted above.

On the question of "close" spacing between multiple diffusers, the examiner notes that the same expressions of "close" or "close proximity" are used by applicant in this application to describe not only the proximity of the diffusers to the side wall and to the bottom wall, but also the spacing between one multiple diffuser and another multiple

Art Unit: 1724

diffusers. See, for example, "the diffuser is located **close** to the bottom of the plant" (col 5 line 52), "**close** to the side wall of the tank" (col 5 line 54), and "grouping all drop lines and diffusers in **close** proximity" below the wastewater treatment plant inlet" (col 3 line 58) (emphasis added). Significantly, however, nowhere does applicant equate "close" with 3 – 4 inches spacing: At col 5 line 52, applicant only says that diffusers close to the bottom are "preferably" 3 – 4 inches from the bottom. The specification as originally filed therefore confirms – in use of "preferably" at col 5 line 52 – that diffusers may be "close" to the bottom, the side wall, or to each other without necessarily being no more than 4 inches apart.

It should be noted also, however, that applicant also implies that when multiple diffusers are used in the course of his invention, it is the placement of each such multiple diffuser "generally below" the inlet to the wastewater tank (and close to the bottom) that "allows for" (col 6 line 19) higher volume gas flows and creation of the "circulation or current pattern of the invention" (col 6 line 21) because Drewery, too, placed multiple diffusers near the bottom, but is said to have created "multiple dead zones" (col 2 line 67). Insofar as applicant distinguished his invention over this prior art disclosing three multiple diffusers spaced circumferentially, the skilled artisan would have understood applicant to have believed that in order to accomplish a chief object of the invention, i.e., the desired current pattern of Fig. 5, if multiple diffusers are used, they must necessarily be placed "generally below" the wastewater inlet in order to form the desired current pattern without "dead spots." "[G]enerally below" is not defined in terms which shed any light on the meaning of "close proximity," however.

Art Unit: 1724

All other rejections asserted in the December 1, 2000, Office action that are not maintained here have been overcome by the Amendment and/or Supplemental Amendment and the arguments noted there.

### **Observation regarding Certificate of Mailing Date**

Notwithstanding the manual inscription "6/1/01" on page 25 near the signature line of the paper entitled, "Amendment," that paper bears a certificate of mailing under 37 CFR 1.8 dated May 25, 2001. Insofar as the paper was actually received by the USPTO on Monday, June 4, 2001,<sup>19</sup> after the response period due date of Friday, June 1, 2001, the paper is timely based on the certificate of mailing date of May 25, 2001.

It is noted further than the separate paper entitled, "Combined Amendment and Petition for Extension of Time," also received by the Office on June 4, 2001, bears a certificate of mail date of June 1, 2001.<sup>20</sup>

### **Objection / Rejection to Reissue Oath**

The reissue oath/declaration filed with this application is defective because it fails to identify at least one error which is relied upon to support the reissue application. See 37 CFR 1.175(a)(1) and MPEP § 1414.

Applicant's arguments on this point are – in the examiner's opinion – adequately addressed in MPEP 1414 (II). The objection is maintained.

---

<sup>19</sup> As evidenced by the US PTO Mail Room date stamp applied to the paper.

<sup>20</sup> As evidenced by the US PTO Mail Room date stamp applied to the paper.



The defined current or circulation pattern produced by this embodiment, as shown in FIG. 1, is such that oxygenation gas forces the fluid within the aeration chamber to move upwards in direction 100 from the diffuser until it reaches the surface of the liquid within the chamber. This forces a current which travels around the conical partition in both directions, as indicated by the numbers 102 and 104. As these currents meet on the opposite side of the partition, the intersection of the outer currents causes a downwardly flowing current 106 which flows to the bottom of the aeration chamber which creates main currents 108, 110, and 112 that sweep across the bottom in all directions. The water sweeping generally in a straight line across the bottom of the vessel in direction 108 moves with the greatest speed and serves to move any solid falling out of the clarifier chamber back into circulation in the aeration chamber, thus preventing any

accumulation of solids in the bottom of the aeration chamber.

The water moving generally around the outer perimeter of the vessel in directions 110 and 112 moves at a slower speed but with enough speed to scour the edges of the vessel and to sweep the solids into circulation. All areas of the bottom of the vessel are forced into circulation. Those areas intermediate between the path straight across the bottom of the vessel and the path around the outer perimeter travel respectively intermediate speeds. While

FIG. 1 shows the entire circulation pattern, FIG. 5-7 show different views of parts of this pattern. As depicted in Figs. 1 and

6, the [air] injection [source, e.g., a diffuser] system[,] generates an area of aerating bubbles adjacent the intersection of the side wall and the bottom wall that induces the current flow shown in

Figs. 1 and 6. Thus, assuming that direction 100 in Fig. 1 depicts the current flow of the wastewater induced at an injection area adjacent the intersection of the side wall and the bottom wall of

the aeration chamber, a branched current having runs indicated by 102 and 104 is produced. Accordingly, multiple [aeration

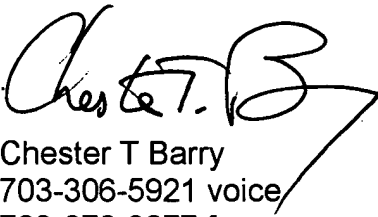
sources, e.g., multiple] diffusers [40,] could be positioned in sufficient proximity to one another such that [upward current

flows from the injection area produced the flow paths indicated by 102 and 104] the current or circulation pattern depicted in Fig. 5

is achieved.

Art Unit: 1724

Accordingly, claims 1, 3 – 10, 17 - 31 are rejected under 35 USC 251 as being based on a defective oath as set forth above.



Chester T. Barry

Chester T Barry  
703-306-5921 voice  
703-872-9077 fax

7/2/01

10/19/01 rev.1